Marek Czajkowski ORCID

Theory of *Spacepower* – a Brief Introduction[1]

Streszczenie

Rosnące wykorzystanie przestrzeni kosmicznej do celów związanych z bezpieczeństwem, handlem i nauką stanowi rosnące wyzwanie dla stosunków międzynarodowych, ponieważ nadaje nowy wymiar relacjom między państwami. Dlatego istnieje duża potrzeba sformułowania teoretycznych ram dla analiz dotyczących tej dziedziny. Jest to szczególnie ważne, gdyż różne cechy przestrzeni kosmicznej sprawiają, że wiele instytucji kształtujących stosunki międzynarodowe jest nieodpowiednich, a nawet nieistotnych. Niestety, teorie dotyczące tego zagadnienia są wciąż w powijakach, mimo że doktryna militarna dotycząca wykorzystania przestrzeni kosmicznej jest dobrze rozwinięta. Niniejszy artykuł odnosi się do niektórych teoretycznych aspektów działalności człowieka w przestrzeni kosmicznej z punkty widzenia stosunków międzynarodowych.

Słowa kluczowe: stosunki międzynarodowe ● teoria stosunków międzynarodowych ● bezpieczeństwo międzynarodowe ● przestrzeń kosmiczna ● bezpieczeństwo kosmiczne ● spacepower

Abstract

The increasing use of outer space for security, commercial and scientific purposes poses a rising challenge for international relations as it adds a new dimension to the relations among countries of the world. Therefore, there is a strong demand to formulate a theoretical framework for analyses regarding this domain. It is especially important because the distinct features of space make many of the institutions that shape international relations inadequate or even irrelevant. Unfortunately theorizing on that issue is still in its infancy, even though a military doctrine of the use of outer space is well established. This paper refers to some theoretical aspects of human activities in space from the point of view of international relations.

Keywords: international relations ● international relations theory ● international security ● outer space ● space security ● spacepower

[1] This paper was completed in April 2017; therefore, it represents the knowledge and views of its author from that period. Some considerations on the issues depicted here may also be found in a forthcoming book: M. Czajkowski, *Przestrzeń kosmiczna w strategii bezpieczeństwa USA* (*Outer Space in the Security Strategy of the USA*), which is supposed to be published in the first half of 2020.

1. Introduction

The exploitation of outer space is becoming increasingly important in the contemporary world, as orbital systems facilitate a multifaceted improvement of the effectiveness of human activities. Functionally, they are of course just another set of tools that Man builds for his convenience in the new domain he is conquering. But from a practical point of view, we can see their enormous divergence when compared to the instruments designed to work in other realms. It is because space-borne assets work in an expanse that is profoundly distinct from the spaces mastered by mankind thus far. In other words, humanity has entered yet another territory that offers new opportunities – but also poses new challenges and problems.

Therefore, there is a need for theories that could be used as a base for an explanation of numerous mechanisms related to the use of outer space, together with their impact on the functioning of states, societies, economies, etc. From the point of view of international relations, it seems particularly important to study the relationship between a state in the context of its basic functions, and outer space with its challenges and opportunities. Thus, a basic question should be asked: how might state-owned and private activities in space affect the international position and capabilities of nation-states? More precisely, what role the Earth's neighbourhood plays or may play in strategies of certain countries – both security and development related. The second issue is more specific and it refers to interactions among states related to their capacities in space and plans to make use of them – to put it the simplest way: how outer space affects international relations on Earth (for the sake of comprehensiveness these considerations should also include non-state actors.) Of these two questions, the first is of primary importance, because it is necessary to first study the capabilities, policies, and doctrines of individual actors – only then it is possible to analyse relations between them.

This paper's content refers to the aforementioned basic question, but a more comprehensive analysis is beyond the scope of a single research article or book. The subject outlined above is, in fact, extremely broad and covers a multitude of problems, ranging from theoretical questions, through issues related to the creation and implementation of doctrines and policies together with their institutional dimension, to specific questions of an economic, technical, military, social or psychological nature. That is why this paper only

refers to a part of this vast field, focusing on some theoretical aspects of the whole problem.

Therefore firstly, we are going to engage in the most general theoretical considerations related to human activities in space, commonly referred to with the term *spacepower*, from the point of view of the theory of international relations. Secondly, we will look through the most important documents that reflect the understanding of *spacepower* by the government of the United States. Thirdly, the main task of this article is to review some proposals that can be found in American academia and refer to the theoretical dimension of the concept of *spacepower*.

The choice of the United States as the subject of our inquiry is quite obvious; it is undoubtedly the most developed country among space-faring nations and highly dependent on the use of space technologies. It is unsurprising then that attempts to create a theory explaining the relationship between a state and outer space are the most prevalent there. We must also emphasize that our review of theoretical propositions regarding *spacepower* has been intentionally limited to several well-known proposals, in order to present a kind of background for further research. It is, therefore, by no means a comprehensive discussion on contemporary *spacepower* theories, which would require a considerable amount of additional research and much more space than just an article in the scientific journal may provide.

2. *Spacepower* in the Theory of International Relations

The conceptual frame that facilitates understanding of the relation between the sea and human society had been formulated at the end of the 19thcentury, taking the form of a comprehensive theory of sea power in the work of Alfred Thayer Mahan. He wrote of *seapower* not only in terms of military might but also in the context of the importance of maritime activities for strength and sustained growth of the economy, as one of the important sources of nations' wealth.

Subsequently, mastering the sky after World War I resulted in the formulation of doctrines related to the military use of airspace, notably those advocated by Giulio Douhet, William Mitchell, and Hugh Trenchard. Later on, a wider concept of *airpower* emerged, with the strong argument that the development of the aviation industry and commercial use of

air transport would contribute to the expansion of the economic and technological capacities of a nation-state – such is, for example, the essence of Alexander de Seversky's thinking.

The concept of *spacepower* was coined by analogy with the abovementioned: *seapower* and *airpower*, but it does not mean that elements of these terms are fully interchangeable. The analogy can be applied mainly due to the fact that every given expanse has some specific physical properties which strongly affect its use and force the invention of suitable technologies. What is more, every one of these three different spaces offers some special attributes, use of which may foster enhancement of strength of the state, its capacity to influence international affairs, security and other issues of relevance. From the point of view of international relations, it is also particularly important that the substantial interests of various international actors constantly intertwine inside these spaces. This, in turn, entails the development of different forms of interactions between states, both within these domains and in connection with each other.

However, despite all the analogies and an inherent need to invent theories that would shape an understanding of the role of outer space in human activities, a comprehensive theory of *spacepower* has not been created to date (with exception of military science where it relates only to the use of armed forces). We are of course not going to try to fill this theoretical vacuum, but some general observations from the points of view of the main schools of international relations seem necessary in order to forma background for our further considerations. It is worth doing, particularly because the simultaneous use of different perspectives may highlight various features of the phenomenon that interests us. Thus, doing so may facilitate the creation of a better picture of the phenomenon than a one-sided approach would provide. In other words, let us see how the use of outer space might look like from the perspectives of major theoretical paradigms, how they might define *spacepower* and which of the basic features of this emerging concept they may highlight. For that purpose, we will briefly and very generally mention realist, liberal and constructivist schools of thought, bearing in mind that these theoretical trends are rich in complex substance and conceptual variety.

The realist theory has emerged from Hobbesian pessimism regarding the nature of Man. It reflects a belief that all the actions of human beings are built on selfishness and willingness to use aggression against those who are weaker. In the field of international

relations, this translates firstly into a strong conviction that a state must be constantly prepared for external threats. Therefore, the realist paradigm in all its variations emphasizes the issue of national security and the need to oppose dangers surrounding a state, with a strong awareness that it is all alone on the international stage. Of course, this does not mean that co-operation among countries is not possible or not necessary, but its implementation must be based solely on the selfish interests of the state.

From the realist standpoint, the very moment Mankind started to make use of a new expanse it almost automatically became a part of international competition. It happened first of all because since the earliest, *pre-Sputnik* stages of space exploration it was clear that the use of orbital systems would become another opportunity to increase the strength and defence capabilities of a state. This reflected the fact that due to its physical properties, the Earth's orbit is what may be called the *ultimate high ground*. As a *high ground* in classic strategy is always useful as an observation point or firing position, outer space is especially well-suited for this, in the sense that no higher place exists. In other words, it is the highest location possible, particularly conducive to activities associated with control over vast areas. Therefore, it is imperative for a nation-state to do its best to master this territory. Such an opportunity must be seized, particularly because opponents certainly aspire to the same thing – to allow them to conquer the Earth's neighbourhood without resistance would surely be highly dangerous.

In practical terms, strategy for the conquest of outer space became a necessity at the very moment when the advance of science and evolving engineering capabilities enabled the creation of appropriate technologies. The most important of them were the ones that might have been used for security, especially in the military sphere – either as weapons or as support for warfighter's effort. Thus, *spacepower* would be understood by realists, in the most general way of course, as the sum total of capabilities of orbital systems which could be used for national security, together with a supporting industry, research-and-development infrastructure and an education system.

The liberal school of thought strongly emphasizes international co-operation in a realm of security as well as in the economy and in cultural relations. This is mainly due to the perception of Mankind's nature in the spirit of optimism of the Enlightenment. According to liberals, Man and his institutions can easily make the world safe if only the "unnatural" shortcomings of political structures and economic systems are eliminated. It means

that nation-states are able to act for the benefit of their citizens if they maintain liberal institutional order and uphold liberal values. This way they can also create an international order based on universal co-operation if only they abandon traditional conflicting policies that do not serve nations' interests.

This kind of thinking may easily be "projected" into space. For liberals, it is just another domain where wide international co-operation may be established and maintained for the benefit of the whole of humanity if only nation-states manage to abandon unnecessary mistrust and other dysfunctional habits. What is more, space-borne applications are especially fit to be the subject of multilateral partnerships. Firstly, by their nature orbital systems' operations affect and concern vast areas, even the world as a whole – thus many countries may be interested in their development. Secondly, satellites are expensive pieces of engineering and their operational costs are high – thus, co-operation in the form of burden-sharing seems natural. Thirdly, by the very nature of outer space, it is rather difficult and highly impractical to simply extend states' sovereignty there – thus, it is a natural *res communis*, and co-operation is the only logical way to use it. And finally, space is a novelty for mankind, it is an expanse that has been "conquered" from scratch. It is therefore quite possible to foster co-operation there without the burden of deeply rooted mistrust and rivalry.

In contemporary international relations, there are also post-modern approaches which emphasize other qualities of reality than those highlighted in the classic theories. Perhaps the most interesting of them is constructivism, though it usually holds that it is not the mainstream theoretical school in the sense that it does not pretend to define permanent features of reality. Instead it offers anew perspective on current reality, producing a new explanatory mechanism based primarily on an analysis of how people and their groups perceive reality and how they "construct" its image for their own needs. In other words, people act on the basis of certain perceptions of reality, according to an intersubjectively created image of it. This, in turn, emerges as a result of complex interactions between humans and their groups on the basis of certain experiences and beliefs existing in a given community. Therefore, all the concepts that are used in the classical theory to describe reality and which appear irrebuttable are in fact conventional and, as such, are subject to change.

As we look at outer space and its use from the constructivist point of view, we observe above all the ways different groups or individuals try to impose their visions of society, elites, and political decision-making systems. And so, the key issues of security and prestige are analysed primarily in terms of current political or economic interests – both individual and corporate. A state's vision of space exploration – or space conquest – that involves goals and aims together with means to achieve certain objectives would thus be subordinated to those who manage to impose their own design, "the construct" of that vision. Constructivists would also investigate in general and in detail a cultural and historical context of the state of human consciousness that forms the base on which "constructs" are erected.

So, from a constructivist point of view, we do not even try to devise a general theory of *spacepower* as such, but rather we are interested in how and why this kind of theory is being built or was being built by others. Then, we search both the realms of ideas and of human activities for the current selfish, often very short-term, interests of individuals that are present in political and social space – they are what really drive politics and society. Doing so we observe many links between interests of different groups and individuals, and methods they use to influence the public's perception of reality.

To sum up, it seems that each of the abovementioned paradigms has its own value and might be useful, which suggests that an interdisciplinary approach is the best option we have in our scientific toolkit. Using it we may produce a short definition of *spacepower* as the overall ability of a state to make use of outer space to advance its interests related to the security sphere, economy, science, international cooperation and prestige. Positivist theories would contribute to an understanding of these dimensions initially, but constructivism and other post-modern approaches would also be useful, particularly in analysing why and how specific strategies of exploitation of space are or have been formed.

3. *Spacepower* in the National Security Policy of the United States

The first studies concerning the feasibility of military use of artificial satellites were conducted as early as the 1940s. One of the most significant was a very comprehensive technical analysis produced in May 1946 by the Douglas Aircraft Company on the request of

RAND Corp[2]. It argued very convincingly that vehicles orbiting the Earth could be used to support communications and reconnaissance as well as to perform purely combative tasks – for example, an orbital bombardment of surface targets. Thus, already in that early stage of development, it was quite obvious that the new technology, if implemented, would surely enhance the military might of a nation-state. This initial wave of interest subsided shortly after the first outburst of high expectations, however later on, in the fifties a number of serious military space programs were launched. The Dwight C. Eisenhower administration was interested particularly in the reconnaissance function of satellite systems, which seemed extremely important due to the expected expansion of Soviet strategic offensive capabilities. Information about Moscow's arsenal was scarce, uncertain and even confusing, which in turn created a dangerous situation where lack of knowledge about the opponent could have resulted in either underestimation or overestimation – both prospects were considered very dangerous. A need to use orbital platforms to collect strategic information was also emphasized in the very prominent report delivered on February 1955, known as *The Killian Report*[3]. It mainly addressed the issue of a possible surprise Soviet nuclear attack against the United States' territory, and orbital applications were considered very promising as platforms capable of gathering information concerning the state of the enemy's preparations.

The first comprehensive policy document outlining the U.S. strategy for the use of outer space was the *U.S. Policy on Outer Space*[4], presented by the National Security Council on the 20th of June, 1958. It contained the first formal assessment of numerous applications of space systems and some guidelines referring to the future development of U.S. capabilities in space. It envisioned the establishment, and subsequent quick increase in numbers and quality, of satellite systems. It was considered necessary in the light of the development of Soviet space technology and related threats. The document, pointed to many uncertainties concerning the future but it was undoubtedly a prelude to the related U.S. space policy. It also greatly contributed to the understanding of the term *spacepower*. Although

[2] *Preliminary Design of an Experimental World-Circling Spaceship*, Report no. SM-11827, Douglas Aircraft Company, Inc., 2 May 1946.
[3] *Report by the Technological Capabilities Panel of the Science Advisory Committee*, US Department of State 2016, Washington, 14 February 1955, at: https://history.state.gov/historicaldocuments/frus1955-57v19/d9 (accessed on 12 March 2017).
[4] *U.S. Policy on Outer Space, NSC 6814*, National Security Council, 20 June 1958, at: http://marshall.wpengine.com/wp-content/uploads/2013/09/NSC-5814-Preliminary-U.S.-Policy-on-Outer-Space-18-Aug-1958.pdf (accessed on 23 May 2016.

this term was not mentioned, *U.S. Policy on Outer Space* provided that the systematic and extensive expansion of space-borne capabilities, along with supportive efforts was to become an important component of the strength and influence of the United States.

Of the current policy documents, we should first mention the most important and the most comprehensive of them, the *National Security Strategy* of February 2015[5]. It is of course a very general document and it covers all the aspects of national security, so the term *spacepower* is not used directly. But in several points the *Strategy* refers to the use of outer space as a significant element of power of the state. Investments in space, along with other ISR[6] and cyber capabilities are considered crucial, and their steady growth is viewed as imperative especially from a military standpoint. This means that the capacity to utilize outer space is of particular importance from the point of view of military might, which is understood as an ability to maintain overall military advantage and ensure the defeat of every possible opponent[7].

Similar points are highlighted in another important document, *The National Military Strategy* of 2015. Here among other points, it is stated, that the great relevance of space systems in maintaining U.S. military superiority is particularly visible in the context of other countries' growing capabilities in this field[8]. This fact greatly increases the need for capacity-building within this area, as it is regarded as one of the fields where decisive advantages are maintained[9].

Much more accurate reflections on *spacepower* could be found in the documents that are specifically devoted to the use of outer space. The first of them is the *National Space Policy*, published in July 2010[10]. The introductory quotations from presidents Eisenhower and Obama indicate that the ability to make use of space is considered a very important part of the broadly understood capabilities of the state – in simpler words, of its strength. The former reminds us that the exploitation of outer space can contribute to

[5] *National Security Strategy*, The White House, Washington, February 2015, at: https://www.whitehouse.gov/sites/default/files/docs/2015_national_security_strategy.pdf (accessed on 23 May 2016).
[6] Intelligence, Reconnaissance, Surveillance.
[7] *National Security Strategy*, op. cit., p. 7.
[8] *The National Military Strategy of the United States*, US Joint Chiefs of Staffs, June 2015, p. 3, at: http://www.jcs.mil/Portals/36/Documents/Publications/National_Military_Strategy_2015.pdf (accessed on 23 May 2016).
[9] Ibid., p. 16.
[10] *National Space Policy*; The White House, 28 June 2010, at: https://www.whitehouse.gov/sites/default/files/national_space_policy_6-28-10.pdf (accessed on 23 May 2016).

improvement of life on Earth. The latter indicates that the development of capabilities in space may be used to strengthen the American leadership[11]. Here, the concept of *space-power* shows up very distinctly, although without using this very term, as the important part of overall strength and capacity of state.

Thus, the most important objectives, mentioned further on in the document, are as follows:

> *"Energize competitive domestic industries to participate in global markets and advance the development of: satellite manufacturing; satellite-based services; space launch; terrestrial applications; and increased entrepreneurship.*
>
> *[…]*
>
> *Increase assurances and resilience of mission-essential functions enabled by commercial, civil, scientific, and national security spacecraft and supporting infrastructure against disruption, degradation, and destruction, whether from environmental, mechanical, electronic, or hostile causes.*
>
> *Pursue human and robotic initiatives to develop innovative technologies, foster new industries, strengthen international partnerships, inspire our Nation and the world, increase humanity's understanding of the Earth, enhance scientific discovery, and explore our solar system and the universe beyond."*[12].

Here we have a very significant notion that the development of an industrial base and the growth of technology creation capabilities are the foundations for advancement of the whole space sector. That in turn determines the ability to build capacities in space and to use them for strength and influence of the state. The question of prestige is also very important and it is built *inter alia* through scientific activities in outer space and its use to research issues important for the whole of humanity. These considerations on *soft power* are supplemented by a more conventional, security related concern referring to the growing need to ensure safety of space systems.

Further on, there are some recommendations, or guidelines, detailed in the document, which should be implemented to achieve the objectives of space policy. It is not necessary to list them all at length here, from our point of view the most important is that *National Space Policy* emphasizes very clearly:

[11] Ibid., p. 1.
[12] Ibid., p. 4.

- the need to strengthen the leading role of the USA in the field of space technology;
- the need for action on the issue of safety in space – both in terms of possible hostilities and with regard to other threats and risks in the space domain;
- the need to maintain development of an appropriate industrial, scientific and educational base;
- and, of course, the need to continue maintenance and to modernize space capabilities important for national security[13].

Thus, *spacepower* emerges from this document as the sum of military and non-military capabilities that are being developed to make use of outer space in order to fulfil the manifold duties of the state. Therefore, it relates not only to space and space systems but also to the support of industrial, scientific, engineering and educational bases. What is more, it is strongly emphasized that extra-terrestrial expanse is not only a state's domain – private entrepreneurship may become a very good partner, so the government should "[…] *promote a robust domestic commercial space industry* […]"[14].

The second basic document that relates to space strategy of the USA is the *National Security Space Strategy*, which is available for the general public only in a shortened version[15]. The full content remains classified. This strategy concentrates on the issues of national security which are not the main subject of this paper, however it is at least worth mentioning briefly the main threats that are listed there. The general observation, of the most profound and far-reaching consequences, is that *"*[...] *space is becoming increasingly congested, contested, and competitive."*[16]. That is why the United States believes that it is necessary to undertake specific actions that are enclosed in a framework of several strategic objectives. One of them, the most relevant from our point of view, is to *"[e]nergize the space industrial base that supports U.S. national security"*[17]. Again, we see that infrastructure that supports the space effort is understood as a basic source of the ability to create and maintain space capabilities.

[13] Ibid., p. 5.
[14] Ibid., p. 10.
[15] *National Space Security Strategy*, Department of Defense and Office of the Director of National Intelligence, January 2011, at: https://www.dni.gov/files/documents/Newsroom/Reports%20and%20Pubs/2011_nationalsecurityspacestrategy.pdf (accessed on 23 May 2016).
[16] Ibid., p. 1.
[17] Ibid., p. 4.

> *"A resilient, flexible, and healthy space industrial base must underpin all of our space activities. We seek to foster a space industrial base comprised of skilled professionals who deliver those innovative technologies and systems that enable our competitive advantage. Our space system developers, operators, and analysts must deliver, field, and sustain national security space capabilities for the 21st century."*[18].

This short analysis of just a few documents shows that the United States implements a complex and comprehensive strategy of the development of space capabilities which is supposed to enhance the state's capacity to achieve its general goals. If it is necessary to define, on the basis of this doctrine, what *spacepower* is, we reaffirm a notion that it is the capacity to promote the state's interests, to enhance its ability to influence international relations and to maintain national security by the use of orbital systems. The whole infrastructure related to space exploration –an industrial-engineering base, scientific research capabilities and education system – is also a part of it. *Spacepower* represents both *soft* and *hard* components because it refers to both military and non-military applications and, last but not least, to the state's prestige.

Finally, it is worth noting, that currently[19], we are on the verge of the announcement of a new space policy by the new U.S. administration. It will most likely be more proactive, more assertive, more security-oriented, but the main elements of *spacepower*, as we understand it, will probably remain the same.

4. Selected Works on the Theory of *Spacepower*

As has already been mentioned, the constant evolution of space applications and their growing importance, especially for national security, requires the establishment of a theoretical framework. It should predominantly contribute to the ability of understanding appropriate mechanisms and phenomena, forecasting future trends, and designing specific measures to achieve desired goals. It is also usually pointed out that theories of that sort appeared in the past with regard to the other domains conquered by mankind, i.e. the concepts of *seapower* and *airpower*. All these theoretical views were largely based on the conclusion that both spaces had their unique properties and both were of great importance for humanity. Furthermore, the said theories aimed to determine the relationship between

[18] Ibid.
[19] This paper was completed in April 2017.

human activities and a given expanse, together with the description of the mechanisms structuring this relationship. And finally, the authors of classical *sea-, airpower* theories formulated sets of conditions/instructions which outlined ways to use a given domain for the benefit of a state and a nation.

It, therefore, seems quite obvious that a similar theoretical approach should be applied to the problem of human activities in outer space. The analogy is very obtrusive, for example, the seminal book *Toward the Theory of Spacepower*[20], which discusses a variety of issues related to the use of outer space, starts from a chapter that reviews Mahan's concept of *seapower* from the point of view of how it could be applied to *spacepower*[21].

In-depth theoretical discourse on the nature of *spacepower* commenced in the United States by the end of the nineties, when the U.S. Space Command started the project named *Space Power Theory*. After some perturbations it resulted in the book *Space Power Theory* by James E. Oberg, published in 1999. In his introductory words, the head of the U.S. Space Command in the period of 1996-1998, general (four-star) Howell M. Estes III observed that there had been an "[…] *obvious vacuum of written theory concerning space that had long since been filled for land, sea and airpower*[…]"[22]. No wonder then that Oberg's book may be considered, as noted specialists observed, an"[…] *initial foray into theory-making*"[23].

Addressing the very nature of *spacepower,* Oberg first describes the significance of outer space for states, societies and economies. It is an obvious introduction and important background because it points to the relevance of the whole issue. Here we also have essential considerations to make regarding the characteristics of outer space that must be clearly understood because„[…] *without an appreciation for how different space is from air, sea, or land* […]*, false analogies and resulting erroneous decisions are possible, even likely*"[24]. Further on, the author presents comprehensive list of *„[e]lements within a nation that make it capable of wielding the "space power"*[…]."[25]. They are: facilities, technology, industry,

[20] C. D. Lutesand, P. L. Hays, V. A. Manzo, L. M. Yambrick, M. E. Bunn (eds.),*Toward the Theory of Spacepower*, Washington, D.C. 2011, at: http://www.dtic.mil/dtic/tr/fulltext/u2/a546585.pdf (accessed on 24 July 2014).
[21] J. Sumida, *Old Thoughts, New Problems: Mahan and the Consideration of Spacepower*, [in:] C. D. Lutesand [et al.], op. cit., pp. 4-14.
[22] H. M. Estes III, *Introduction*, [in:] J. Oberg: *Space Power Theory*, Washington, DC, 1999, p. ix.
[23] J. B. Sheldon, C. S. Gray, *Theory Ascendant? Spacepower and the Challenge of Strategic Theory*, [in:] C. D. Lutesand [et al.], op. cit., p. 307.
[24] J. Oberg, op. cit., p. 43.
[25] Ibid., p. 44.

hardware and other products, economy, populace, education, tradition and intellectual climate, geography and exclusivity of capabilities/knowledge[26]. *Nota bene*, here we see a clear reference to Mahan, who also enumerated the conditions that were necessary to create and make use of *seapower*.

Oberg's general attitude is very traditional and well rooted in a classic realist mindset. He points primarily to the strength of a state, though it should be built not only by the work of its own institutions but with the co-operation of other subjects. This conservative attitude is especially prominent in relation to the last of the abovementioned points – exclusivity of capabilities/knowledge. It is considered the desired state of affairs, *"[s]ince experience demonstrates that any such benefits are bound to be short-lived, efforts to protect these features must be matched by efforts to develop replacement features."*[27]. Thus, Oberg stresses the self-sufficiency of a state in building its own capacities in outer space, arguing at the same time, that others, i.e. competitors should be denied such capabilities.

Especially interesting and insightful are Oberg's considerations concerning the impediments to exercising *spacepower*. Firstly, he lists technical and organizational problems (with the proficiency stemming out of engineering education and 22 years of work for NASA[28]). There are high launch costs, bottlenecks that mean that "[…] *the space is reachable only through extremely narrow channels* […]"[29] and vulnerabilities, as space is naturally a very unfriendly medium. Next, he points to the socio-political issues such as collective consciousness, social perception of issues related to the advancement of science, and problems of the decision-making process. Oberg also refers extensively to the impediments embedded in the international environment. This problem seems especially important, for

> *"[a] user's "space power" does not exist in isolation. The exercise of space power is influenced by many external factors, ranging from enhancement through transnational alliances to constraints by international treaties."*[30].

International law and co-operation in its development seem to Oberg a particular threat to the enhancement of *spacepower*. Mostly because the law that governs international co-operation in space is underdeveloped and highly imprecise. Although an international law

[26] Ibid., pp. 44-47.
[27] Ibid., p. 47.
[28] *Profile*, jamesoberg.com, at: http://www.jamesoberg.com/profile.html (accessed on 6 June 2016).
[29] J. Oberg, op. cit., p. 70.
[30] Ibid., p. 78.

as such might be useful as a regulator of interactions between states, Oberg is conservative and pessimistic regarding its development, and that attitude is based on an understanding of the very nature of space exploration.

> *"[I]n general, long-term reliance on treaties to control behavior in space is problematical due to the still unresolved incompatibility between a discipline based on precedent (law) and an unprecedented activity in which most earthside analogies are misleading (space). And whereas maritime law developed only after many, many centuries of maritime activity, space law is being set in place often prior to the very activities it is intended to govern. Since space lawyers have no special talents in prognostication, their guesses are no better than those of other space experts, with one exception: when their guesses(expressed as treaties) are off base, their work threatens to distort what otherwise would have been the natural development of space activities."*[31]

To sum up, James Oberg stresses that the problem of exercising *spacepower* is not purely technology-limited, but it also has economic, social, political and diplomatic dimensions.

> *"Thus, a strategy for enhancing a nation's space power, and for maximizing the efficiency with which that nation can exploit its space advantages, must include a wide array of developments. Improving technological capabilities is at the core of such a strategy, but it is not sufficient by itself. Finding adequate funds for unavoidable expenses while seeking ways to reduce space operations cost is critical. Understanding and forestalling threats to the missions are critical. And sustaining a supportive cultural environment and a sympathetic (or at least not antithetic) legal environment are both critical as well.*
>
> *Only when a complete and cohesive national understanding of the mutual interdependence of these factors is in place can a country fully reap the benefits of space power."*[32].

It seems then that Oberg's theoretical approach might be more or less reduced to defining the preconditions for the establishment of an ability of a state to utilize outer space for its purposes the best way. Here, considerations regarding the importance of space and on restrictions of its use are especially important. We may also agree with some that however valuable and insightful Oberg's vision is, it "[…] *lacks a comprehensiveness that links*

[31] Ibid., p. 79.
[32] Ibid., pp. 85-86.

spacepower to national power in a manner that elucidates the nature of spacepower, and perhaps overly focuses on the technological dimension at the expense of others."[33].

The next important, very ambitious attempt to build a theoretical model of geopolitics in outer space that is worth mentioning here is Everett C. Dolman's *Astropolitik. Classical Geopolitics in the Space Age,* published in 2002[34]. The book discusses in detail the political implications of the development of space technologies and it reaches far beyond today's problems. A rich historic background and vast bibliography should also be noted as a distinct feature of this volume.

In the very first statements Dolman declares that *Astropolitik* is a book about a grand strategy, in fact, the grandest strategy of all, where the Earth with its surface is reduced to just one of the components – the most important, of course, but one of the many[35]. He states clearly that he has produced the theory to explain the world but not only from a current perspective, but also for the future when humanity with all its virtues, ideas and devices has spread across the Solar System.

Dolman very clearly affirms a realist approach, defining his *Astropilitik* in the narrow sense as "[…] *the extension of primarily nineteenth- and twentieth-century theories of global geopolitics into the vast context of the human conquest of outer space […]"*[36], and in the broader understanding as the "[…] *refined realist vision of state competition into outer space policy, particularly the development and evolution of a legal and political regime for humanity's entry into the cosmos."*[37]. He also has no doubts as to the future of international relations –

> *"[s]imply put, in a world of modern territorial nation-states (whose demise has been prematurely announced), collective action dilemmas will prevent those political entities from cooperatively exploiting the realm, and efforts to enjoin states to do so will have negative if not countervailing results. […] In the short term, despite our best intentions, we may be relegated to a harsh, discordant, entirely realist paradigm in space."*[38].

[33] J. B. Sheldon, C. S. Gray, op. cit., p. 307.
[34] E. C. Dolman, *Astropolitik. Classical Geopolitcs in the Space Age*, London 2002 (Kindle Edition).
[35] Ibid., p. 1.
[36] Ibid.
[37] Ibid.
[38] Ibid., p. 2.

For the purpose of his analyses, the author of *Astropolitik* has coined the term *astropolitics*, which he defines as a "[…] *study of the relationship between outer space terrain and technology and the development of political and military policy and strategy*." Consequently, the *astrostrategy* is "[…] *identification of critical terrestrial and outer space locations, the control of which can provide military and political dominance of outer space, or at a minimum can insure against the same dominance by a potential opponent state*."[39]. In this context, *Astropolitik* should be

> "[…] *identified as a determinist political theory that manipulates the relationship between state power and outer-space control for the purpose of extending the dominance of a single state over the whole of the Earth. It presumes the state that dominates space is specifically chosen by the rigors of competition as the politically and morally superior nation, culture, and economy."*[40].

It is also worth noticing a determinism or *astrodeterminism* as Dolman states, of the presented theory. It is basically a recognition of the fundamental fact, that in all actions throughout history man was dependent on constraints imposed on him by space and he environment he has lived in. Furthermore, these constraints were different in different places on Earth, and humanity overcame them at a different pace using various methods and forms of organisation – specifically by developing successive technologies. Dolman pays a particular attention to the fact that societies, which emerged and evolved in different environments, were likely to choose different patterns of organizing a state. This, in turn, determined their ability to undertake space exploration and the effectiveness of related efforts.[41]

Contemplating an *astrostrategic* perspective further on Dolman notes that:

> *"[t]he terrain of space is essentially the unseen topography of gravity wells and electromagnetic emissions. Vulnerabilities in space forces will be categorized as in orbit (direct attack on spacecraft), on the ground (vulnerability of support facilities including launch and control, production, and monitoring sites to nuclear, conventional, or guerrilla attack, and espionage), and in electromagnetic transit (specifically the control up and data down links to disruption, jamming, and interception of data streams)."*[42].

[39] Ibid., p. 13.
[40] Ibid.
[41] Ibid., pp. 14-26.
[42] Ibid., pp. 39-40.

Therefore *astropolitics*, as an extension of classic geopolitics,

> "[…] *contains all of the classic elements of geostrategy [...]. List's logistical transportation net, Mackinder's pivot area, Mahan's choke-points, strategic narrows, and lanes of commerce, Douhet's and Mitchell's vital centers and avenues of attack, De Seversky's spherical modeling, and the multitude of nuclear theorists' contrary logic all have counterparts in outer space."*[43].

Following defining fundamental terms and their place within a framework of the theoretical achievements of geopolitics to date, Dolman turns to more specific considerations when referring to *spacepower*, which here is understood plainly as the capability to act in space. The further course of analysis, based on the theory already put forward, is as follows:

> *"First, many classical geopolitical theories of national military development are fully compatible with, and will prove readily adaptable to, the realm of outer space. Second, the most applicable of these theories will be military power assessments of geographical position in light of new technologies. […] Third, the special terrain of solar space dictates specific tactics and strategies for efficient exploitation of space resources. […] Fourth, the concept of space as a power base in classical, especially German, geopolitical thought will require some modification, but will easily conform to the exploitation and use of outer space as an ultimate national power base. Finally, a thorough understanding of the astromechanical and physical demarcations of outer space can prove useful to political planners, and will prove absolutely critical to military strategists. […] In order to animate these positions, and in accordance with the examples set by Sir Halford Mackinder and Nicholas Spykman, the formulation of a neoclassical astropolitical dictum is established: Who controls low-Earth orbit controls near-Earth space. Who controls near-Earth space dominates Terra. Who dominates Terra determines the destiny of humankind."*[44].

Note how complete Dolman wants his vision to be when he introduces his own paradigm and places it alongside the classics.

In the following chapters, the author describes in detail a number of important issues of the orbital mechanics, the history of rivalry in space and the evolution of the legal regime and international co-operation, as he tries to position his theory in as wide a context as possible. Especially important are the considerations that concern a translation of the

[43] Ibid., pp. 41-42.
[44] Ibid., pp. 6-7.

classic geopolitics into *astropolitics* and which reflect the MacKinderean observations on geography. Dolman notices that four distinct *astropolitic regions* exist in outer space and they vary in physical characteristics. The first is *Terra* (Earth) with its atmosphere. The second is the *terran* (earth) space, which extends slightly beyond the geostationary orbit. The third is the *lunar* (moon) space that spans from a boundary of the *terran* space to just outside an orbit of the Moon. And finally, there is the fourth region, the *solar space*, meaning the rest of the solar system[45]. Furthermore, Dolman recognizes the significance of particularly important orbits within the *terran* space[46], and the value of libration points in the *lunar* space[47], while the *solar* space is *Lebensraum* for expanding humanity[48].

In his most important conclusions Dolman specifies the central goal of activities of a state in the international environment seen from the realist point of view primarily as an arena of competition. It is, and should remain, the formulation and sustainment of the politics of domination in space, or at least of maximization of benefits derived from space exploitation while simultaneously denying them to others, if possible. Additionally, Dolman introduces six dimensions that a properly conceived *astropolitics*, as the way of defining and executing certain policies, should contain[49] in order to facilitate the achievement of that long-standing and crucial aim.

1. Society and culture. *Astropolitical* society should above all be enthusiastic about space exploration. Thus, it should be ready for the individual and collective sacrifices necessary to muster resources for the implementation of space programs. Dolman even uses such terms as *"fascination"*, *"national spirit"* or *"feeling of the adventure"* to describe the desired state of collective consciousness. Society should also perceive the conquest of outer space as a moral imperative, and science, along with technology, should be publicly revered. A government should create and maintain such a mindset, if necessary.

2. Political environment. An *astropolitic* state must be effectively organized to be able to execute grand technological projects, and here Dolman agrees that liberal capitalism is a better pattern than a centrally planned economy. It is mainly because he sees negative,

[45] Ibid., pp. 60-61.
[46] Ibid., pp. 65-67.
[47] Ibid.
[48] Dolman actually uses the word *Lebensraum*: Ibid., p. 61.
[49] Ibid., p. 145.

dysfunctional traits of central planning on the one hand, and the importance of political legitimization of democratic systems on the other.

3. Physical environment. Practical demands of space travel require wide spaces for complex infrastructure, significant manpower, strong industry, and so on. Therefore the space-faring state should possess vast natural resources and a large population. The latter is necessary to man space projects together with supporting efforts and to provide proper funding via taxation.

4. Military and technology. Armed forces are obviously the vanguard of space exploration; therefore they must be properly organized and trained to be able to operate in outer space. This requires an integration of the military around this main task; a state should also promote the development of technologies facilitating the effectiveness of space forces. It requires the funding of scientific/educational centers, a government must also be ready to finance grand military research projects.

5. Economic base. The industry must be strong, high-tech, innovative and highly adaptive. But a basic precondition for it is a government's support for technological advances and for the diffusion of the new technologies within a civilian industry, as the private space sector is the most important. A state should also be ready to financially assist strategic branches of industry, even if it contradicts a free market paradigm.

6. Theory and doctrine. These are methods set to organize a government and means to perceive the world; therefore space theory and doctrine must include and bind together all of the above-mentioned dimensions. So, a plan of coordinated development in all those realms is necessary for the implementation of an effective strategy which, in turn, must be directed by a doctrine, because it is the doctrine that integrates all relevant factors.[50]

As we can see it is the proposal of the total, however more or less within a framework of liberal and free-market order, mobilization of the resources of a state and society for the maximization of rate and scope of exploitation of outer space. In other words, to use space for its own good and especially for its security, a state must muster all its wealth and resources.

[50] Ibid., pp. 145-147.

In summary, it should be emphasized that there is a manifest contradiction between a strong state that implements grand visions and mobilizes all the society and economy for that purpose, and the democratic order, together with a principle of free-market economy. Such grand designs, executed by a state must change the political system and society's mindset. And in fact, it has actually happened – Walter MacDougall in his insightful analysis of the space race firmly points to the problem of the rising technocracy in the USA and to the corresponding transformation of liberal society and market economy that took place as a result of the organizational and economic demands of space conquest[51].

The other course of the critique of Dolman's approach includes, among others, Mathew Burris[52],who has convincingly argued that the very concept of space hegemony is flawed and counterproductive[53]. Dolman, however, reiterates his view, for example in the well-known article[54], to which the above-mentioned Burris' paper is the response.

Finally, it is worth quoting Sheldon and Gray again, who notice, that Dolman's vision is immense and well documented, intellectually very influential but at the same time quite controversial[55]. They also notice that Dolman's approach lacks theoretical versatility, as it is basically focused on a proposal for action addressed to the U.S. government[56]. This last remark does not, however, look entirely right – in fact, Dolman devotes a lot of effort to concrete issues while analyzing the current state of affairs from the American point of view, but theoretical foundations laid down in the initial chapters of *Astropolitik* seem general enough to be considered as a comprehensive theory.

The other, more recent example of the general theory of *spacepower* is the book *Developing National Power in Space: A Theoretical Model*[57], by Brent Ziarnick[58]. According to the author, its purpose is to construct a "[…] *serious military-type strategic theory for a nation's space program* […]"[59], however, he has firstly constructed a general theoretical approach and only applied it to the military sphere. From our point of view, Ziarnick's

[51] W. A. McDougall, *The Heavens and the Earth: A Political History of the Space Age*, Baltimore, MD 1997.
[52] Air Force Major Matthew David Burris is USAF judge advocate and the legal expert specializing in space issues.
[53] M. Burris, *Astroimpolitic. Organizing Outer Space by the Sword*, "Strategic Forces Quarterly" 2013, vol. 7, no. 3.
[54] E. C. Dolman, *New Frontiers, Old Realities*, "Strategic Forces Quarterly" 2012, vol. 6, no. 1, pp. 78-96.
[55] J. B. Sheldon, C. S. Gray, op. cit., p. 307.
[56] Ibid., p. 308.
[57] B. Ziarnick, *Developing National Power in Space: A Theoretical Model*, MacFarland 2015.
[58] Air Force Major Brent Ziarnick is currently an assistant professor at the USAF Air University.
[59] Ibid., p. 11.

considerations are very interesting because he proposes a wide theoretical model that could be used for many purposes.

In the most general terms Ziarnick understands *spacepower* as:

> *"[t]he first form of spacepower is its raw, basic, or general form: the ability to do something in space. The second form of space powers is in its applied form – when the basic power (ability) of an entity is used by that entity for a specific purpose."*[60].

Next, he provides analogies with works of great classical thinkers who contemplated military instruments of state policies, Carl von Clausewitz and Alfred Mahan. First of all, he proposes a Clausewitzean[61] division into *logic* and *grammar* of *spacepower*, where:

> *"[t]he Logic of Space Power modeled in its Logic Delta, is the warrior's art: space power used to promote the interests of the space power. The Logic of Space Power is concerned with ends and ways, in the ends/ways/means paradigm of strategy. The Grammar of Space Power, described by its Grammar Delta, is the mason's art: developing the tools with which to wield and expand space power. The Grammar of Space Power is the realm of means."*[62].

The concept of deltas is an extension of the interpretation of Mahan ideas undertaken by James Holmes and Toshi Yoshihara who picture it as a form of *dual tridents*[63]. Ziarnick's delta resembles a pyramid in the form of an isosceles triangle with the third shorter side bent inwards[64]. The corners of these deltas represent elements of *spacepower* while their apexes symbolize the synergy of elements within both logic and grammar.

Grammar Delta consists of a base where corners represent *production* on the sharp end, which is considered the most important, and *shipping*, and *colonies* on the other corners – the apex is called *Access*. So, *"[g]rammar is concerned with building the hardware that allows a space power to operate in space."*[65]. If looking from above, we see *production* that means wealth stemming from exploitation of outer space, which is the backbone of the economic sphere of *spacepower*; *colonies*, an expansion of the market into outer space that facilitates trade and promotes *production*; and *shipping*, transportation of products,

[60] Ibid., p. 16.
[61] Ibid.
[62] Ibid.
[63] Ibid.
[64] It somehow resembles, intentionally or not, an emblem of the Starfleet portrayed in "Star Trek" TV shows and feature movies.
[65] B. Ziarnick, op. cit., p. 17.

be it material via spacecraft or immaterial via electromagnetic spectrum[66]. If we take a side view of the Grammar Delta we would see that it lies on what is called the *foundation*, which means the fundamental conditions that are necessary to develop basic elements of the delta. The second level is the base of the delta, and above it there is another one called *combinations*, where elements are put together which, in turn, leads to the ultimate objective: *Access*[67]. So, the Grammar Delta represents a phased process of developing *spacepower* that runs from the bottom up.

According to Ziarnick[68], the current incarnation of the Grammar Delta may be portrayed as follows. Services that appear thanks to the use of space systems, especially telecommunications and earth imagery make up *production*. In the future, it will probably be supplemented by the manufacturing of goods, energy generation, other services like space tourism, and perhaps even by mining operations in space. *Shipping* comprises mostly of electromagnetic communications, less often of spacecrafts' cargo. In the future, space vessels as the means of *shipping* will probably have a bigger role. As for today, *colonies* are the orbiting satellites – they host devices that serve for *shipping* and for *production*. In the future, satellite systems will probably grow in size and capacity and, in time, some bases on the Moon and on other celestial bodies may be established. Finally, the *Access* is an ability to place objects in space and make use of them

> *„[f]or instance, by combining a production, shipping, and colony element (a camera payload, a Communications link to the ground, as well as a rocket to place the system in orbit, and a satellite bus) we can produce a new space power access: the capacity to take and receive space imagery form low Earth orbit."*[69].

The Logic Delta's base comprises of the three elements: economic, political and military power, when the leading, sharp point is economic strength, considered the most important. The apex is the *Ability*, "[…] *pure space power, the ultimate expression of the work that the Grammar Delta accomplishes*."[70]. So, grammar, the material base of *spacepower*, passes through its apex into logic, which therefore should be portrayed top-down in a side view. Thus we have the *Ability*, as "[…] *combined sum of Access derived from the Grammar*

[66] Ibid.
[67] Ibid., p. 18.
[68] Ibid., pp. 20-21.
[69] Ibid., p. 21.
[70] Ibid., p. 22.

Delta"[71], that morphs into the above-mentioned elements of power that rest at the base of Logic Delta. On the way between them, there is a level called *transformers*, characterized as:

> *"[…] the ideas and concepts used to translate raw ability to do something in space into concrete applied power. Transformers turn the capacity to operate in space into concrete power from space that can be applied to economic, political, or military use to achieve national objectives."*[72].

Transformers are ideas or concepts that might be divided into three types applicable to three kinds of *spacepower*: *business plan*, *soft-power concept*, and *military doctrine*[73]. *Transformers* are of course necessary to facilitate translation of raw capabilities into concrete *spacepower* because without the preplanned way of making use of these capabilities it is impossible to turn them into benefits. What is more, the quality of *transformers*, meaning the efficiency of structures that provide them, seems especially important for devising *spacepower* effectively.

Thus, economic *spacepower* is the creation of wealth thanks to space applications, today in the form of revenues stemming from the use of orbital systems managed by private or state-owned entities. They make a profit, create jobs and provide taxes, adding to the general welfare of a state and its society. But of course, it requires a properly formulated business plan – Ziarnick points to the example of commercial success of telecommunications companies that was possible only due to efficient planning of business activities[74]. In the future, other forms of space-based business such as tourism, energy generation or resource extraction will probably be developed.

Political *spacepower* reflects an ability to achieve political goals by the means of *soft power* such as cooption or attractiveness, leaving political coercion to a military sphere. In practical terms, it means building the prestige of a state by showing its capabilities in terms of organization and technology. This, in turn, proves that a political-economical-social system of a state is efficient and thus it becomes attractive. Surely, the exploration of space may lead to such a goal. The Apollo Programme is one example, as it was conceived as a largely political project aiming to enhance the prestige of the United States[75].

[71] Ibid., p. 23.
[72] Ibid.
[73] Ibid., p. 24.
[74] Ibid., p. 25.
[75] Ibid.

Military *spacepower* is, of course, an ability to conduct both combat missions and non-combat operations to supporting the armed forces. There are a number of modern orbital systems that support the military, from satellite reconnaissance, through communications and weather services, to positioning for the purpose of navigation. In the future, space weapons may emerge, especially in the form of systems supposed to affect spacecrafts owned by an opponent – such weaponry is already technically feasible, it has not been fielded to date because it is still considered politically and strategically impractical, but that may change. It must, of course, undergo constant revision and updates[76].

Finally, it is worth re-emphasizing the relationship between grammar and logic that is the key to understanding *spacepower*, the way it is created and the way it works, as portrayed by Brent Ziarnick.

> *"[T]he Grammar Delta (the building blocks of space power) and the Logic Delta (the intent and application apparatus of space power) are linked through the all-important concepts of access and ability. Access is the capacity to place an element in a specific area in space, and the sum total of discrete accesses available to the space power entity in question plus the intent to use that aggregate access for any purpose is ability. Access and ability connect the Grammar and Logic Deltas to form a complete and collimated model of space power."*[77].

There are a lot more detailed considerations concerning all the above-mentioned elements of Ziarnick's proposal, and the means and methods of creation of the *spacepower* of the United States. But it is not possible to review them at length, it is also not necessary because basic points of the general theory have already been described.

The approach presented in *Developing National Power in Space* has considerable value as an explanatory model, which may be adopted in a number of different spheres of space activities as well as to the whole complex of space politics. It also possesses important prognostic value because it is so general and so comprehensive that it will probably be possible to use it in the future.

[76] Ibid., p. 26.
[77] Ibid., p. 27.

5. Summary

The concept of *spacepower* can be found in many books and articles but usually with a rather limited scope. The most common approach is a narrow, military view that crosses into other spheres only when it is necessary to explain how non-military efforts support military applications of the space systems. So, it is commonly understood that orbital infrastructure may facilitate the effectiveness of a state within the realm of national security in terms of military power. Within such an approach, considerations concerning science, technology or economy are present mostly in the context of their value as the enhancement of military capabilities. There are many works that represent such an attitude, for example, the classic and very comprehensive book *On the Edge of Earth: The Future of American Space Power*[78], by Steven Lambakis. There are of course many others.

If to summarize the most general theoretical assumption, together with a doctrinal attitude of the US government and, above all, with the findings of all three authors whose works we reviewed, we could reiterate that *spacepower* is an ability of the nation-state to make use of outer space for its own purpose. This general assumption is followed by questions, about how this ability manifests itself, how it is created and maintained, how it interacts with other capabilities of the state, and what is its place in general doctrine and in specific policies of the state. These important questions are only partially answered in relation to general, theoretical considerations; thus the real theory of *spacepower* is still to be devised.

In our opinion, the main flaw of the theories presented is their one-sided realist approach, as they originate basically from a security-oriented mindset. To be honest, it is unsurprising because satellite applications were first used as a military support tool before growing enormously in their military and political significance. But even in this realm a realist approach does not give us a comprehensive perspective and does not answer every question. It is because the main shortcoming of the realist theory is a general assumption that states behave rationally. It is not true and we can clearly see it even in the security sphere, as we watch how various issues become securitized not by their very nature but because of certain individual interests. The evolution of such problems like the role of outer space in the deterrence politics of nation-states or in the global balance of power, depends

[78] S. Lambakis, *On the Edge of Earth: The Future of American Space Power*, Lexington 2001.

greatly on individual perceptions of individual persons, not on some abstract decision-making mechanism. Therefore, it is also worth looking at problems of the use of space also perspectives other than the realist one; in particular, the real *spacepower* theory should embrace the constructivist approach.

All in all, we think that the *spacepower* theory should encompass not only a state-centric perspective but should also try to explain the roles of other entities. The abovementioned authors refer of course to private entrepreneurship, but rather reluctantly and from a perspective of the state as an unquestionable leader – that is especially evident in Dolman's vision. But nowadays, private entities become less and less dependent on the state, they act more and more according to their own set of goals and values that may strongly differ from those of a state. There is, for example, the cut-throat competition between the traditional players of the global launch industry, well connected to the military and the government, and newcomers from the new high-tech private companies. The old giants are most probably destined to lose this fight or at least will be forced to transform, but whatever happens, access to space will no longer depend on a state and its traditional close allies. The new venture capital has a big part to play in the next phases of the development of space applications.

The real *spacepower* theory must, therefore, consider other dimensions of international relations, not just security issues, and new actors of modern interconnected world of high technology. Secondly, the theory of *spacepower* must understand human nature, embracing all the drivers that are behind activities in space as well as related restrictions– it is mainly because the world of politics and society are not the domain of rational choices. Quite the contrary, in fact.